

Bulk Metallic Glass for Low Noise Fluxgate, Phase II

Completed Technology Project (2013 - 2015)



Project Introduction

The team of Prime Photonics, Virginia Tech, and Utron Kinetics propose to develop a fabrication technology that will result in drop-in replacements for a diminishing supply of NASA fluxgate magnetometer ring cores. Specifically, we plan to capitalize on trends observed during the Phase I effort in terms of control over material properties in bulk, cobalt-rich metallic glass materials with increased permeability, tunable Curie temperature, highly controlled coercivity and saturation inductance, all without the introduction of magnetostrictive-based excess noise. The bulk nature of the material will provide an unprecedented degree of freedom in core geometry design over existing ribbon-form amorphous alloys, allowing for net shape, drop-in fluxgate cores that can compete with, or exceed noise levels observed in the 6-81.3 permalloy family. The Phase I effort brought the technology from observed trends in materials, a TRL of 1, to a level wherein analytical observations and proofs of concept have been carried out, a TRL of 3. During the Phase II effort, we projection a minimum TRL of 4 at the completion of the effort.

Primary U.S. Work Locations and Key Partners

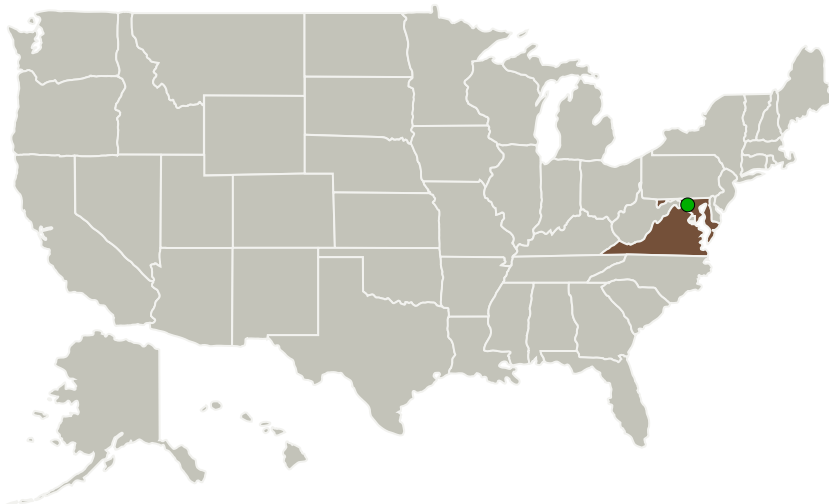


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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Prime Photonics, LC

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

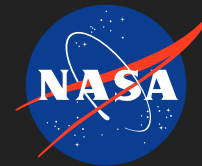
Program Manager:

Carlos Torrez

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Organizations Performing Work	Role	Type	Location
Prime Photonics, LC	Lead Organization	Industry	Blacksburg, Virginia
 Goddard Space Flight Center(GSFC)	Supporting Organization	NASA Center	Greenbelt, Maryland

Primary U.S. Work Locations	
Maryland	Virginia

Project Transitions

**July 2013:** Project Start**July 2015:** Closed out

Images

Project Image

Bulk metallic glass for low noise fluxgate

(https://techport.nasa.gov/image/126344)

Project Management
(cont.)

Principal Investigator:

David Gray

Co-Investigator:

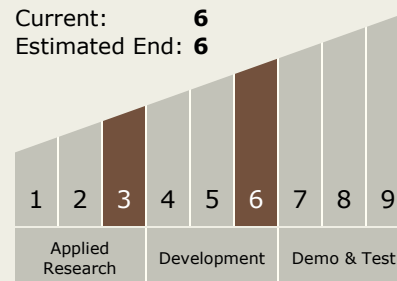
David K Gray

Technology Maturity
(TRL)

Start: 3

Current: 6

Estimated End: 6



Technology Areas

Primary:

- TX12 Materials, Structures, Mechanical Systems, and Manufacturing
 - TX12.1 Materials
 - TX12.1.7 Special Materials

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System